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[Molecular immunology of Japanese cedar pollen allergens: analysis of T cell epitopes].

[Article in Japanese]

Hashiguchi S, Sugimura K

Department of Molecular Biology, Faculty of Engineering, Kagoshima University.

Recent studies demonstrated that partial alteration of the amino acid sequence of T cell epitopes induced a stimulatory signal that was qualitatively different. Therefore, it is conceivable that immunotherapy using peptides representing dominant T cell epitopes could modulate the T cell response of allergic patients and prevent the production of IgE antibodies. Accordingly, a number of allergens have been molecularly cloned to determine their amino acid sequences. In Japan, the number of patients suffering from Japanese cedar pollinosis is steadily increasing and it has become a serious social problem. In this paper, we review the recent advances on T cell epitope mapping of Japanese cedar pollen, Cry j 1 and Cry j 2 and immunomodulating trials based on the mechanisms of T cell antigen-recognition.

Publication Types:
- Review
- Review, tutorial

PMID: 8810803

1: *Tissue Antigens* 1996 Jun;47(6):485-91

Japanese cedar pollinosis and HLA-DP5.

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Japanese cedar pollinosis is a type I allergic disease caused by Japanese cedar (Cryptomeria japonica) pollen. We investigated the association between the disease and HLA class II alleles by HLA-DNA typing using a PCR-SSOP method and found that the frequency of HLA-DP5 (DPA1*02022 and DPB1*0501) was significantly increased in the patients. To investigate whether the HLA-DP5 molecule is directly involved in the pathogenesis of the disease, Japanese cedar pollen antigen (CPAg)-specific T cell lines were established from 3 patients who possessed HLA-DP5 (DPA1*02022/ DPB1*0501). By using these CPAg-specific T cell lines and HLA class II-expressing L-cell transfectants, we found that disease-associated HLA-DP5 restricted T cells specific for CPAg existed in the patients. Furthermore, among 38 synthesized overlapping peptides spanning the entire length of one of the major Japanese cedar pollen allergens, Cry j 1, an immunodominant peptide which induced HLA-DP5 restricted Th2 was identified. These observations suggest that the HLA-DP5 may be involved, at least in part, in the pathogenesis, by helping the IgE antibody production against CPAg.

PMID: 8813737

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Th1/Th2 response profiles to the major allergens Cry j 1 and Cry j 2 of Japanese cedar pollen.

Sugimura K, Hashiguchi S, Takahashi Y, Hino K, Taniguchi Y, Kurimoto M, Fukuda K, Ohyama M, Yamada G

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Cry j 1 and Cry j 2 are known to be the major allergens of Japanese cedar pollen. A comparative study was carried out on the immune responses to stimulation with Cry j 1 and Cry j 2 in 24 symptomatic patients and six nonallergic subjects. In T-cell proliferation assays, mean stimulation indexes (SI) were 10.6 for Cry j 1 and 11.7 for Cry j 2 stimulation, respectively, in the allergic patients. Two of the nonallergic subjects showed strong T-cell proliferation to both allergens, while the remainder did not. All the allergic subjects (17/17) showed high titers of anti-Cry j 1 IgE antibody at a mean value of 165 U/ml, whereas only 64% responded to Cry j 2 with low titers at a mean value of 26 U/ml. Nonallergic subjects did not respond with IgE production. Allergic subjects were further examined for their cytokine production profiles. All allergic subjects tested (16/16) produced high levels of interferon-gamma (IFN-gamma) in response to Cry j 1 with a mean value of 918 pg/ml, while only five subjects showed significant elevation of IFN-gamma production in response to Cry j 2 with a mean value of 679 pg/ml. The remainder produced small amounts of IFN-gamma. Cry j 1 induced higher levels of interleukin (IL)-10 gene expression than did Cry j 2 stimulation, while both allergens induced IL-4 expression at a similar level. The IL-12 p35 gene was constitutively expressed, whereas the IL-12 p40 gene expression in Cry j 1-stimulated cells was elevated eightfold over that of nonstimulated cells. Increased expression of the IL-12 p40 gene was negligible in Cry j 2-stimulated cells. Thus, Cry j 1 stimulated mixed features of Th1 and Th2-like responses, while Cry j 2 played a minor role in inducing IgE production and cytokine (IFN-gamma, IL-10, and IL-12) production, except for IL-2 production and strong T-cell proliferative activity. Therefore, it was concluded that Cry j 1 is the more important allergen, and that T-cell proliferation assays do not necessarily reflect the level of allergenicity.

PMID: 8905002